

Description

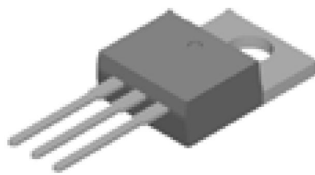
The PD78M series are monolithic integrated circuits designed as fixed-voltage regulators for a wide variety of applications including local, on-card regulation. This series of regulators are complete with internal current limiting, thermal shutdown protection, and safe-area compensation which make them virtually immune from output overload. If adequate heat sinking is provided, these regulators can deliver output currents up to 0.5A. The PD78M series are available in two standard plastic packages: TO-220-3 and TO-252 (1).

Feature

- Output current up to 500mA
- Fixed output voltages of 5V,6V,8V,9V and 12V
- Output Voltage tolerances of $\pm 5\%$ over the full temperature range
- Internal short circuit current-limiting
- Internal thermal overload protection
- No external components
- Pb-free

Application

- Consumer Electronics
- Microprocessor power supply
- Mother board I/O power supply



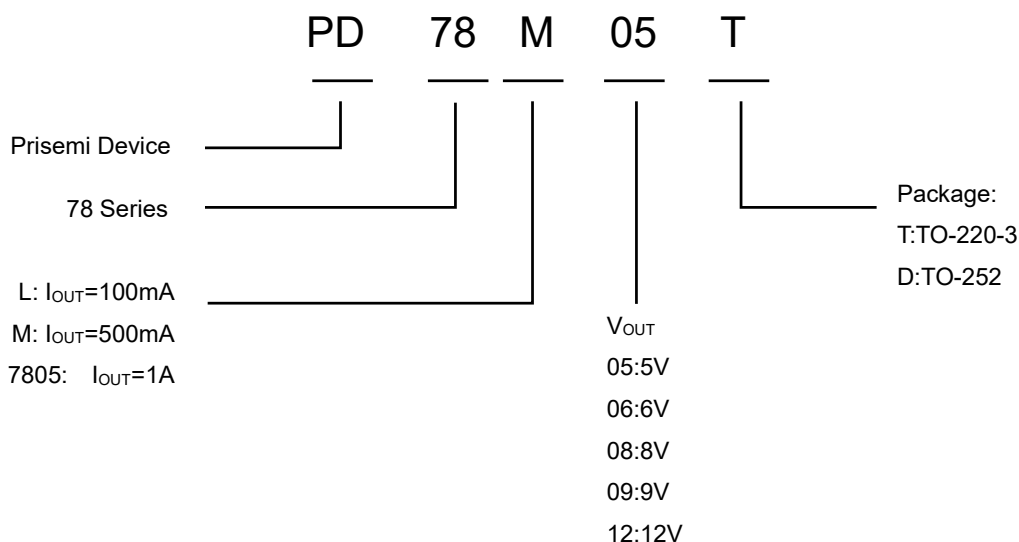
TO-220-3



TO-252

Figure 1. Package Types of the PD78M series

Naming Rule



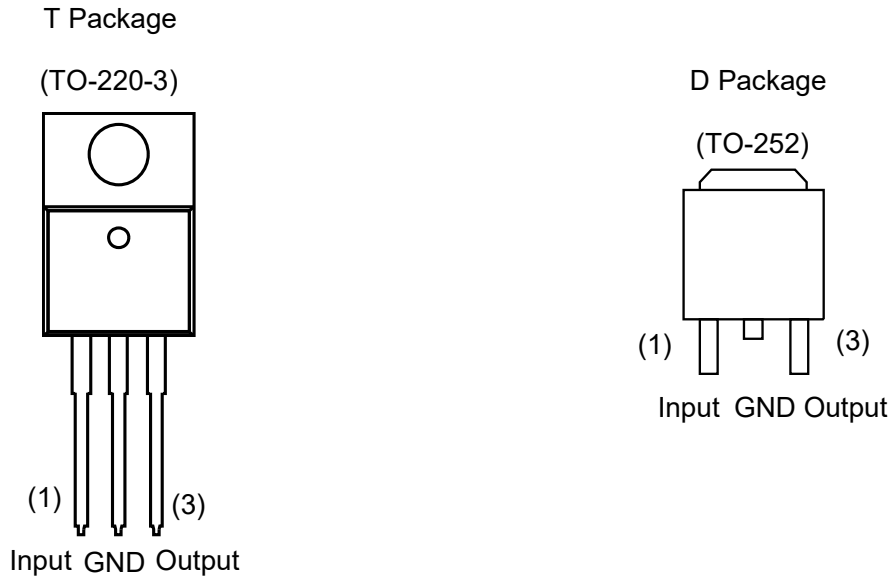


Figure 2. Pin Configuration of the PD78M series

Absolute maximum rating (Note 1)

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	35	V
Operating Junction temperature range	T_J	150	°C
Lead Temperature (Soldering, 10sec)	T_{LEAD}	260	°C
Power Dissipation	P_D	Internally Limited	W
Storage Temperature Range	T_{STG}	-65 to 150	°C
Thermal Resistance	θ_{JC}	TO-220	60
		TO-252	100
ESD (Human Body Model)	ESD	2500	V
ESD (Machine Model)	ESD	2500	V

Note 1: Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

Pin Description

Pin Number	Pin Name	Function
1	Input	Voltage Input
2	GND	Ground
3	Output	Voltage Output

Functional Block Diagram

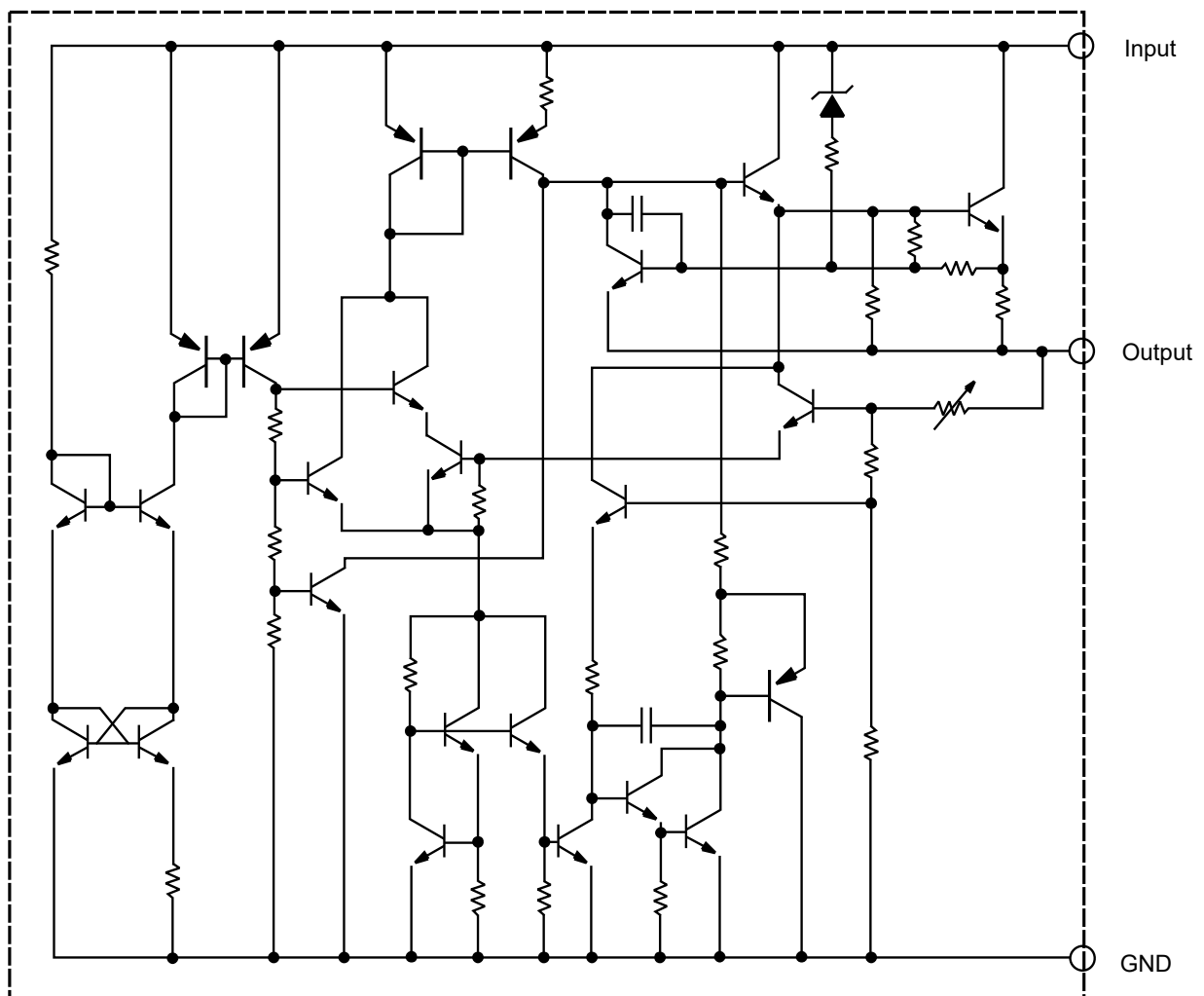


Figure 3. Functional Block Diagram of the PD78M series

Electrical Characteristics

PD78M05 ($V_{IN}=10V$, $I_{OUT}=350mA$, $C_{IN}=0.33\mu F$, $C_{OUT}=0.33\mu F$, $T = -40^{\circ}C$ to $125^{\circ}C$, $P_D \leq 5W$, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$	4.8	5	5.2	V
		$7.0V \leq V_{IN} \leq 20V$ $5.0mA \leq I_{OUT} \leq 350mA$	4.75	5	5.25	
Line Regulation	V_{RLINE}	$7.0V \leq V_I \leq 25V, I_{OUT}=200mA$	-	3	100	mV
Load Regulation	V_{RLOAD}	$5.0mA \leq I_O \leq 500mA$	-	20	100	mV
Quiescent Current	I_Q	$I_{OUT}=0$	-	3.2	6	mA
Quiescent Current Change	ΔI_Q	$8.0V \leq V_I \leq 25V, I_{OUT}=200mA$			0.8	mA
		$5.0mA \leq I_O \leq 350mA$			0.5	
Output Noise Voltage	N_O	$10Hz \leq f \leq 100kHz$	-	40	-	μV
Ripple Rejection	PSRR	$f=120Hz, 8.0V \leq V_I \leq 20V$ $I_{OUT}=200mA, 18.5V \leq V_I \leq 28.5V$	62	73	-	dB
Peak Output Current	I_{PK}			700		mA
Short Circuit Current	I_{SC}	$V_{IN}=35V$		50		mA
Dropout Voltage	$V_{IN}-V_{OUT}$	$\Delta V_{OUT}=1\%$		2		V

PD78M06 ($V_{IN}=11V$, $I_{OUT}=350mA$, $C_{IN}=0.33\mu F$, $C_{OUT}=0.33\mu F$, $T = -40^{\circ}C$ to $125^{\circ}C$, $P_D \leq 5W$, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$	5.75	6	6.25	V
		$8.0V \leq V_{IN} \leq 21V$ $5.0mA \leq I_{OUT} \leq 350mA$	5.7	6	6.3	
Line Regulation	V_{RLINE}	$8.0V \leq V_I \leq 25V$, $I_{OUT}=200mA$	-	5	100	mV
Load Regulation	V_{RLOAD}	$5.0mA \leq I_O \leq 500mA$	-	20	120	mV
Quiescent Current	I_Q	$I_{OUT}=0$	-	3.2	6	mA
Quiescent Current Change	ΔI_Q	$9.0V \leq V_I \leq 25V$, $I_{OUT}=200mA$			0.8	mA
		$5.0mA \leq I_O \leq 350mA$			0.5	
Output Noise Voltage	N_O	$10Hz \leq f \leq 100kHz$	-	45	-	μV
Ripple Rejection	PSRR	$f=120Hz$, $8.0V \leq V_I \leq 20V$ $I_{OUT}=200mA$ $18.5V \leq V_I \leq 28.5V$	62	73	-	dB
Peak Output Current	I_{PK}			700		mA
Short Circuit Current	I_{SC}	$V_{IN}=35V$		50		mA
Dropout Voltage	$V_{IN}-V_{OUT}$	$\Delta V_{OUT}=1\%$		2		V

PD78M08 ($V_{IN}=14V$, $I_{OUT}=350mA$, $C_{IN}=0.33\mu F$, $C_{OUT}=0.33\mu F$, $T=-40^{\circ}C$ to $125^{\circ}C$, $P_D \leq 5W$, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$	7.7	8	8.3	V
		$10.5V \leq V_{IN} \leq 23V$ $5.0mA \leq I_{OUT} \leq 350mA$	7.6	8	8.4	
Line Regulation	V_{RLINE}	$10.5V \leq V_I \leq 25V$, $I_{OUT}=200mA$	-	6	100	mV
Load Regulation	V_{RLOAD}	$5.0mA \leq I_O \leq 500mA$	-	25	160	mV
Quiescent Current	I_Q	$I_{OUT}=0$	-	3.2	6	mA
Quiescent Current Change	ΔI_Q	$10.5V \leq V_I \leq 25V$, $I_{OUT}=200mA$			0.8	mA
		$5.0mA \leq I_O \leq 350mA$			0.5	
Output Noise Voltage	N_O	$10Hz \leq f \leq 100kHz$	-	52	-	μV
Ripple Rejection	PSRR	$f=120Hz$, $11.5V \leq V_I \leq 21.5V$ $I_{OUT}=200mA$ $18.5V \leq V_I \leq 28.5V$	56	62	-	dB
Peak Output Current	I_{PK}			700		mA
Short Circuit Current	I_{SC}	$V_{IN}=35V$		50		mA
Dropout Voltage	$V_{IN}-V_{OUT}$	$\Delta V_{OUT}=1\%$		2		V

PD78M09 ($V_{IN}=15V$, $I_{OUT}=350mA$, $C_{IN}=0.33\mu F$, $C_{OUT}=0.33\mu F$, $T=-40^{\circ}C$ to $125^{\circ}C$, $P_D \leq 5W$, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$	8.65	9	9.35	V
		$11.5V \leq V_{IN} \leq 24V$ $5.0mA \leq I_{OUT} \leq 350mA$	8.55	9	9.45	
Line Regulation	V_{RLINE}	$11.5V \leq V_I \leq 25V$, $I_{OUT}=200mA$	-	6	100	mV
Load Regulation	V_{RLOAD}	$5.0mA \leq I_O \leq 500mA$	-	25	180	mV
Quiescent Current	I_Q	$I_{OUT}=0$	-	3.2	6	mA
Quiescent Current Change	ΔI_Q	$11.5V \leq V_I \leq 25V$, $I_{OUT}=200mA$			0.8	mA
		$5.0mA \leq I_O \leq 350mA$			0.5	
Output Noise Voltage	N_O	$10Hz \leq f \leq 100kHz$	-	52	-	μV
Ripple Rejection	PSRR	$f=120Hz$, $12.5V \leq V_I \leq 22.5V$ $I_{OUT}=200mA$, $18.5V \leq V_I \leq 28.5V$	56	61	-	dB
Peak Output Current	I_{PK}			700		mA
Short Circuit Current	I_{SC}	$V_{IN}=35V$		50		mA
Dropout Voltage	$V_{IN}-V_{OUT}$	$\Delta V_{OUT}=1\%$		2		V

PD78M12 ($V_{IN}=17V$, $I_{OUT}=350mA$, $C_{IN}=0.33\mu F$, $C_{OUT}=0.33\mu F$, $T = -40^{\circ}C$ to $125^{\circ}C$, $P_D \leq 5W$, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$	11.5	12	12.5	V
		$14.5V \leq V_{IN} \leq 27V$ $5.0mA \leq I_{OUT} \leq 350mA$	11.4	12	12.6	
Line Regulation	V_{RLINE}	$14.5V \leq V_i \leq 30V$, $I_{OUT}=200mA$	-	8	100	mV
Load Regulation	V_{RLOAD}	$5.0mA \leq I_o \leq 500mA$	-	25	240	mV
Quiescent Current	I_Q	$I_{OUT}=0$	-	3.2	6	mA
Quiescent Current Change	ΔI_Q	$14.5V \leq V_i \leq 30V$, $I_{OUT}=200mA$			0.8	mA
		$5.0mA \leq I_o \leq 350mA$			0.5	
Output Noise Voltage	N_o	$10Hz \leq f \leq 100kHz$	-	75	-	μV
Ripple Rejection	PSRR	$f=120Hz$, $12.5V \leq V_i \leq 22.5V$ $I_{OUT}=200mA$, $18.5V \leq V_i \leq 28.5V$	55	60	-	dB
Peak Output Current	I_{PK}			700		mA
Short Circuit Current	I_{SC}	$V_{IN}=35V$		50		mA
Dropout Voltage	$V_{IN}-V_{OUT}$	$\Delta V_{OUT}=1\%$		2		V

Typical Performance Characteristics

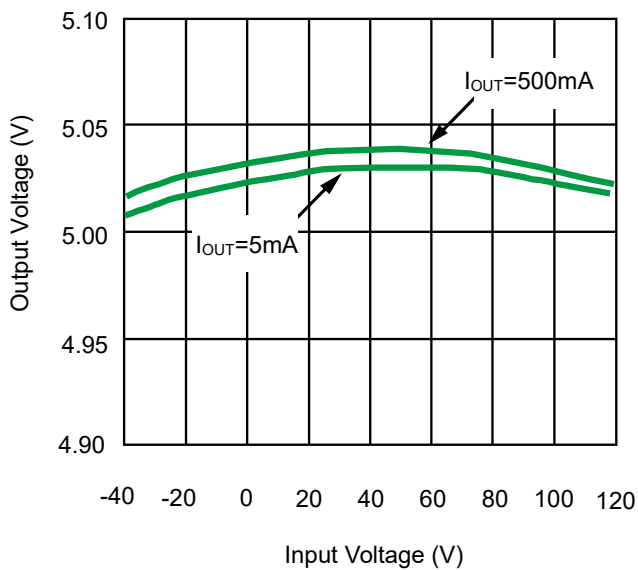


Fig.4 Output Voltage vs. Junction Temperature

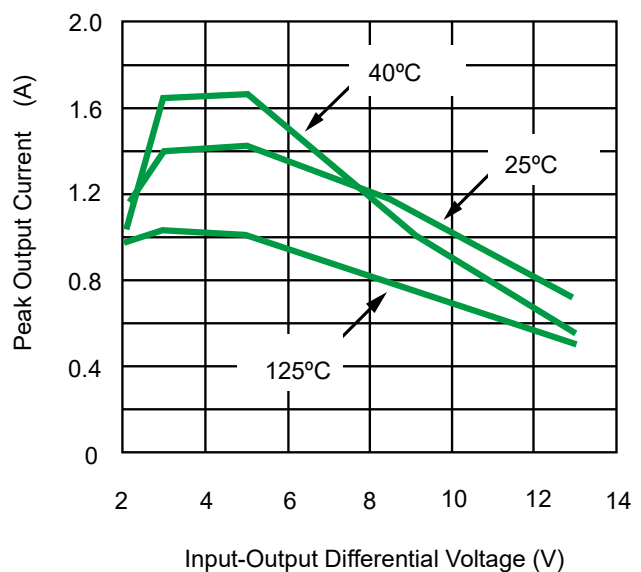


Fig. 5 Peak Output Current vs. Input-Output Differential Voltage

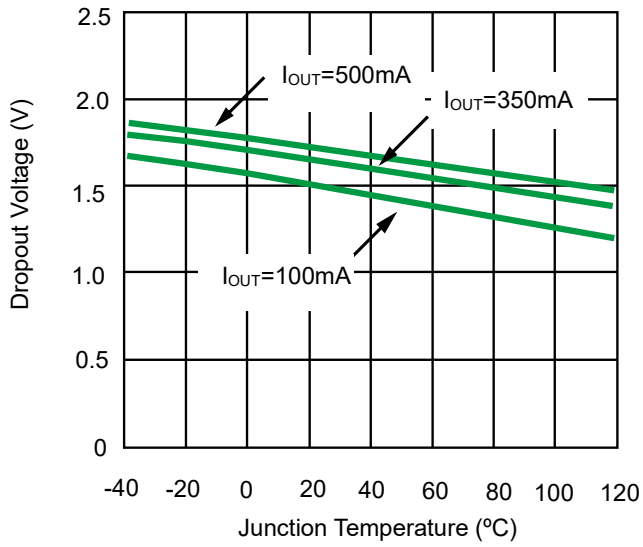


Fig.6 Dropout Voltage vs. Junction Temperature

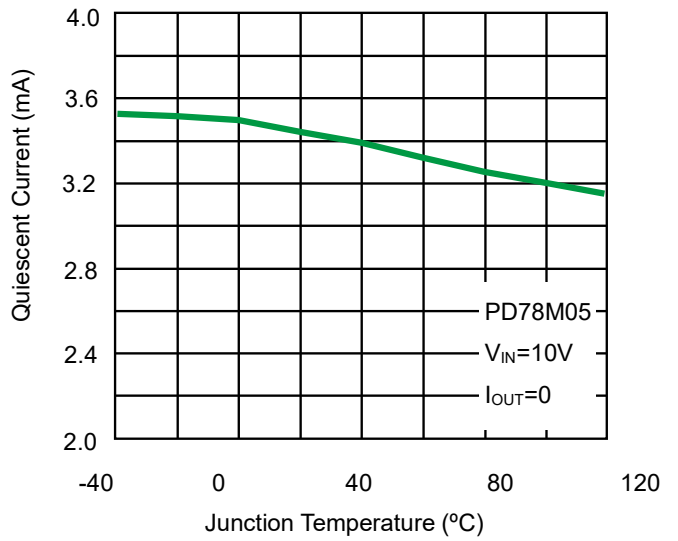


Fig. 7 Quiescent Current vs. Junction Temperature

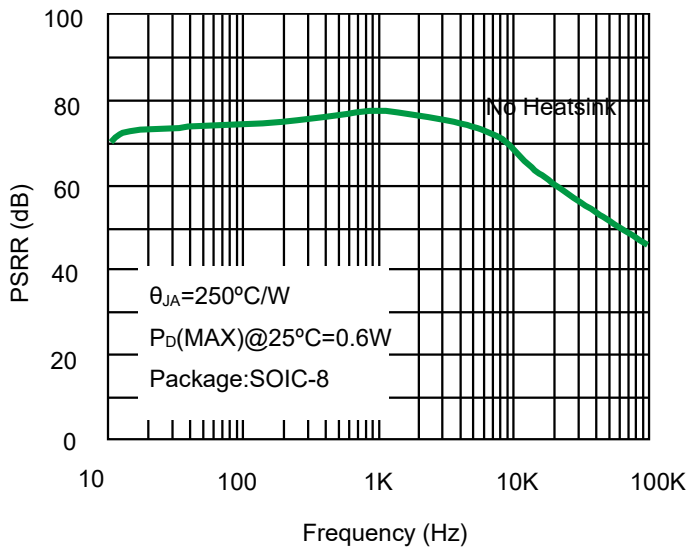


Fig.8 PSRR vs. Frequency

Typical Application

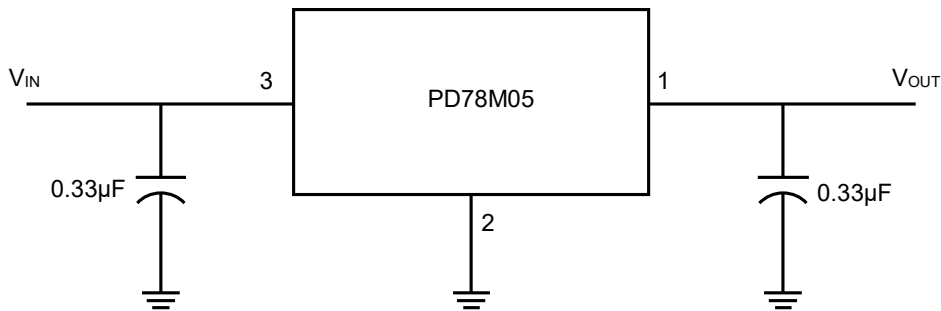
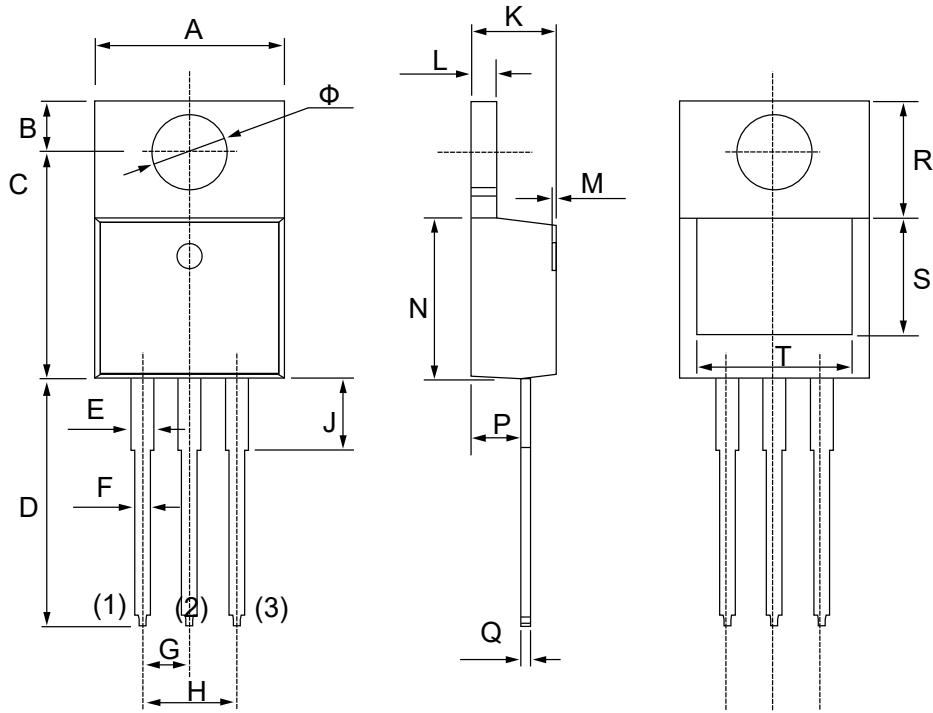


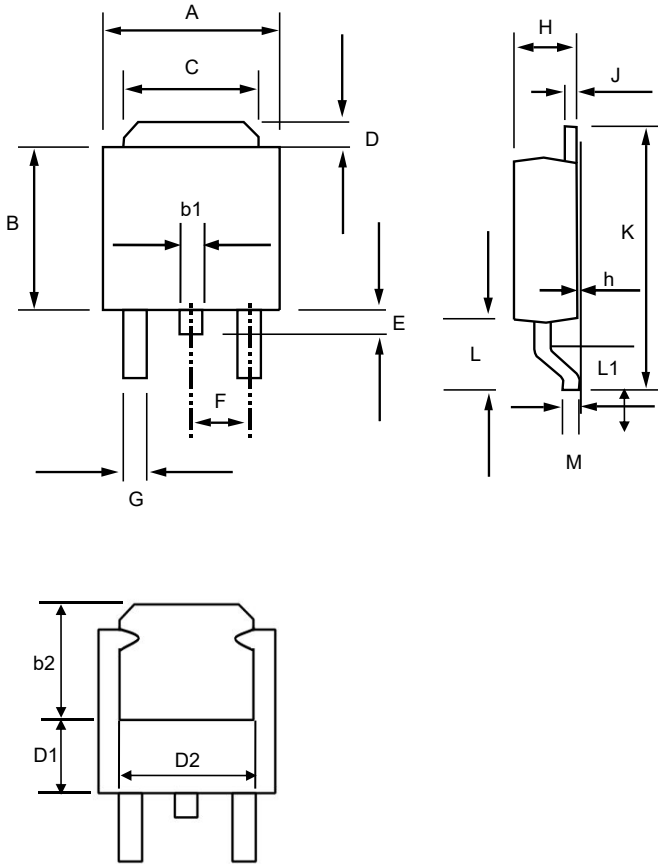
Figure 9. Typical Application of the PD78M Series

Product dimension(TO-220)




Dim	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	10.010	10.350	0.394	0.407
B	2.590	2.890	0.102	0.114
C	12.060	12.460	0.475	0.491
D	13.400	13.800	0.528	0.543
E	1.170	1.370	0.046	0.054
F	0.710	0.910	0.028	0.036
G	2.540 TYP.		0.100 TYP.	
H	4.980	5.180	0.196	0.204
J	3.560	3.960	0.140	0.156
K	4.470	4.670	0.176	0.184
L	1.200	1.400	0.047	0.055
M	0.000	0.300	0.000	0.012
N	8.500	8.900	0.335	0.350
P	2.520	2.820	0.099	0.111
Q	0.380	0.520	0.014	0.020
R	6.600 REF.		0.260 REF.	
S	6.060 REF.		0.239 REF.	
T	8.440 REF.		0.332 REF.	
Φ	3.735	3.935	0.147	0.155

Product dimension (TO-252)



Dim	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	6.350	6.650	0.250	0.262
B	5.400	5.700	0.213	0.224
b1	0.700	0.900	0.028	0.035
b2	5.350REF		0.211REF	
C	5.200	5.400	0.205	0.213
D	1.350	1.650	0.053	0.065
D1	1.700 REF		0.067 REF	
D2	4.890 REF		0.193 REF	
E	0.600	1.010	0.024	0.040
F	2.300TYP		0.091TYP	
G	0.500	0.700	0.020	0.028
H	2.200	2.400	0.087	0.094
h	0.000	0.127	0.000	0.005
J	0.430	0.580	0.017	0.023
K	9.500	10.100	0.374	0.398
L	2.550	2.900	0.100	0.114
L1	1.400	1.780	0.055	0.070
M	0.430	0.580	0.017	0.023


IMPORTANT NOTICE

 and **Prisemi**[®] are registered trademarks of **Prisemi Electronics Co., Ltd (Prisemi)** ,Prisemi reserves the right to make changes without further notice to any products herein. Prisemi makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Prisemi assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in Prisemi data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Prisemi does not convey any license under its patent rights nor the rights of others. The products listed in this document are designed to be used with ordinary electronic equipment or devices, Should you intend to use these products with equipment or devices which require an extremely high level of reliability and the malfunction of with would directly endanger human life (such as medical instruments, aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), please be sure to consult with our sales representative in advance.

Website: <http://www.prisemi.com>

For additional information, please contact your local Sales Representative.

©Copyright 2009, Prisemi Electronics

 **Prisemi**[®] is a registered trademark of Prisemi Electronics.

All rights are reserved.